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Keynote Address to the 2009 Designing an Effective Online Science Course Conference

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Keynote Address to the 2009 Designing an Effective Online Science Course Conference

Thanks and welcome. I have historically found it an abuse of the English language to mention that something is the “first annual” since, well, it isn’t annual yet. But after seeing the preparations for this meeting today and the topics to be discussed, I have a new point of view: “first annual” expresses a sense of optimism. I am optimistic and hopeful that today is just the start of a very important dialog and learning opportunities and that there will indeed be another edition of the Designing an Effective Online Science Course conference . The team that put this together: Dave Wilson, Heidi Leuszler, Dave Leake, Kathy Bruce, and I am sure there are others: you have done an outstanding job. I am honored to be the first keynote speaker.

I’m going to start by doing something polite women don’t normally do. I’m going to share my age.

I’m 35 years old.

Now, I’ll grant you that a 35 year old chief academic officer is not a common thing. But, those my age are coming to vice presidencies and executive leadership positions near you before too terribly long. They are probably already leading academic departments and programs at your colleges, and they are absolutely among your faculty right now.

I think there is some relevancy in reflecting on how someone my age has experienced the Internet. We’re not so old, but we’re certainly not pre-teen text messaging fiends either. So, here’s how I have experienced the Internet.

I asked for and received my first email address when I arrived on the campus of Muhlenberg College as an 18 year old. I don’t believe I have written a letter by hand since. I have never sent out a stand alone paper memo in my professional career. I’m not confident where to put street addresses, dates, and salutations in formal letters that I need to write, print, and sign.

I got on the Internet for the first time the second half of my second semester of my senior year at Muhlenberg. It will come as no surprise to those who know me here that the first page I ever went to was ESPN.com. Even though the computer beamed all text on a blue screen, the real time sports scores were intoxicating. This was spring 1996. I have to imagine that even those who graduated just one year after me, in 1997, were able to use the Internet for their academic projects and to start looking for jobs. Those freshmen I met during my senior year, the class of 1999, I have to imagine, were already using the Internet as an information source of first or second choice, not as a novel afterthought, by the time they graduated.

In summer of 1996 when I showed up for grad school at the University of North Carolina, there was already one computer wired to the Internet and we only used it to check email and surf the Internet. About 14 months later, when I realized I wanted to leave Carolina with a master's degree and teach chemistry, I performed my complete job search using that computer. I never purchased a paper copy of the Chronicle of Higher Education. I never looked at any print classified ads. This was 1997 and 1998.

So, I found the faculty opening at Parkland College using the Internet and I had researched Parkland College using the Internet and apparently interviewed well enough to get a job teaching chemistry. Within 2 years was teaching chemistry online. The year was 2000, I co-taught with another chemistry faculty member who had developed CHE 100, Introduction to Chemistry, online. By Fall 2000, I was teaching the online section of CHE 100 solo. By Spring 2001, I had developed a new course, CHE 106, Chemistry for the Health Professions, online by myself. An online section or sections of CHE 106 has filled every spring, summer, and fall semester since. In fact, it took until Fall 2006, five years from its inception, and a modification of a pre-req in a biology course, to cause CHE 106 to make for the first time ever on campus.

I received my doctoral degree from the College of Education at the University of Illinois in 2007. Had my adviser not directed me to go to the Education Library to find a certain binder of information regarding validity of certain old survey that I mentioned once in my dissertation draft, I would have never stepped foot in the largest public university library in the world. I downloaded pdfs of research articles, I ordered books over interlibrary loan to be delivered to Parkland's library where I picked them up, I constructed my research survey online and delivered it online, and, of course, received the results back online. I do not own a bound copy of my very own dissertation.

I am 35 years old. This has been my educational experience as a student and as a professional. And with the help of U.S. Census data (which I found online, of course), I estimate there are 150 million Americans my age and younger. I assume that they more or less have had or are having a similar experience with the online world.

Therefore, I find it completely baffling that we in the academy still debate the value of online education.

I have to imagine our debate is not unlike the debates associated with the introduction of the printing press or the electronic calculator.

In a way, it's not a debate at all. The cases of the printing press, the electronic calculator, and the Internet and their roles in education should be framed as an intellectual exercise. A new technology has arrived and it's taking the world by storm. It's changing the way people approach, process, and share information. People must still approach information. They still

must process information. They must share the information. How must we in the academy adjust so we can guide our pupils toward accurate and responsible approaching of, processing of, and sharing of this information using this new technology?

Specific to the audience gathered here today is the conversation and bit of controversy surrounding online science courses and online science labs. There are numbered many among our science colleagues who feel, and I've used the word "feel" deliberately here, who feel that it can't be science unless it's "hands on".

Hands on what?

What must hands touch in science for something to be called science, or to be called a science experiment?

Look. I have two degrees in chemistry. My field of expertise was the chemistry of microelectronics. While I was in grad school, I do not recall ever using a beaker, making a solution, or using a balance. I sat at a lot of computer consoles hooked up to high vacuum systems taking measurements of things I could not see.

If there is some sort of definitive list of things I should have had my "hands on" to be minted as a master's degree chemist...well, I would not be a master's degree chemist.

But I still took measurements.

I still thought critically about those measurements.

I changed the conditions of the experiments based on results.

Sometimes I don't consider myself much of a scientist anymore because I've been inactive in the field for so long and since I don't teach chemistry any longer. But I remember I'm a scientist, and I'm proud I'm one, when I recognize how I approach college problems, analyze them, and attempt to solve them.

I can't point to what physical thing I had to have my "hands on" at some point in order to have learned this problem solving skill.

But over time, in all those science classrooms and labs, some compilation of learning objectives crafted me into a scientist.

This is the language I believe we need to use, and the thought process we must employ, as we consider designing effective online science courses. What are the learning outcomes?

Let me appeal to others in the academy as an example.

Our college, probably like yours, has a gigantic number of sections of ENG 101, Composition I. There's something like Gigantic minus 1 number of instructors teaching Composition I at Parkland College. I know that some faculty have their students read classics like Shakespeare and Jane Austen and write narrative essays based on those novels. Some faculty choose accounts of historical events like the Civil War or Wounded Knee to do the same. Other faculty pick issues such as racism or gay rights to do the same. But at the end of the semester, no matter whether the student read about King Lear or transvestites, I have confidence that they know how to write a narrative essay, an argumentative essay, and a persuasive essay.

Could it be possible that scientists could actually take a page from Humanities faculty?

Let's change the conversation. Let's move away from what a science student must put their hands on in order to be a scientist and instead use learning objectives to convey what they must know, what they must think, and what they must do. If we move our minds away from building lists of the physical resources we think our students must touch, we might find out just what it means to be a scientist.

Let me be clear: I am not advocating that a student in general chemistry need not ever touch a beaker. But rather, I'm advocating that you think about why we ask why students to touch beakers in the first place. Is it because someone forced us to when we were chemistry students? Or is it because we are trying to instill something about the concept of measurement? Is it possible to instill that concept without using a beaker? If so, how?

I am delighted you are gathered here today to take up the conversation about designing effective online science courses. You are the people, the faculty and administrators, who need to control this conversation. You need to control it because for at least 150 million Americans the internet is a fixture in our lives. I think the decision about the importance of this medium has already been made for us, but it is our job to make sure that we help our students access, process, and share information accurately and responsibly. You also need to control the conversation because you are the experts about what science is. You have the capacity to explain that it's just not the beaker, it's how and why you use the beaker. This group has the potential to make sure that higher education science online is every bit as good as it is on campus, and for 150 million Americans, perhaps even more relevant. We know our country lacks individuals in the Science, Technology, Engineering, and Mathematics fields. Those who are 18 and younger can either help us close the gap or make it wider. And guess what? They are both in classrooms and on Internet and its derivatives right now forming their opinions about STEM fields. Let's get to where the action is with integrity.

Have an outstanding conference. Let the conversations begin.